

## **6.0 ALTERNATIVES TO THE PROPOSED ACTION**

In conformance with CEQA Guidelines Section 15126.6, the EIR has included a comparative impact assessment of “alternatives to the proposed project.” The primary purpose for this section is to provide decision makers and the public with a “reasonable range” of project alternatives that could feasibly attain most of the basic project objectives, while avoiding or substantially lessening any of the project’s significant adverse environmental effects. Important considerations for this alternatives analysis include the following (as noted in Section 15126.6):

- An EIR need not consider every conceivable alternative to a project
- An EIR should identify “alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process...”
- Reasons for rejecting an alternative include the following:
  - Failure to meet most of the basic project objectives
  - Infeasibility
  - Inability to avoid significant environmental effects.

Other than cumulative short-term air quality emissions associated with construction activities and the possibility of indirect growth inducement outside of Orange County, the Subsequent Environmental Impact Report (SEIR) has not identified any “unavoidable” significant impacts of the project, as all potentially significant impacts can be mitigated to less-than-significant levels. However, certain cumulative impacts, to which the project would contribute, may be slightly reduced with some of the alternatives. Project-related cumulative impacts include air quality and noise, although the project’s contribution is not “cumulatively considerable” as defined in CEQA Guidelines Section 15126.6. As noted in Section 3.5, Project Need and Objectives, the proposed project’s basic objectives are to:

- Provide a reliable local source of potable water to Orange County that is sustainable independent of climatic conditions and the availability of imported water supplies or local groundwater supplies
- Provide product water that meets all the potable (drinking water) requirements of the Safe Drinking Water Act (SDWA) and the Department of Health Services (DHS)
- Reduce salt imbalance of current imported water supplies by providing a potable water source with lower salt loads for blending with existing supplies
- Remediate the subject site of on-site contaminants resulting from approximately 35 years of use as a fuel oil storage facility in order to protect the health and safety of those in the surrounding community

- Create ecosystem and biologic resources benefits that may accrue due to decreased pressures on existing water resources and reduced contamination within receiving waters
- Minimize demands on the existing imported water system.

The following alternatives to the proposed project are discussed: the “No Project” alternative, “Alternative Site” alternative, “Alternative Ownership and Operation” alternative, “Alternative Intake and Discharge Designs” alternative, “Alternative Facility Configuration” alternative,, “Reduced Facility Size” alternative, and the “Environmentally Superior” alternative. A comparison of issues with implementation of identified alternatives is provided in Table 6-1, Comparison of Alternatives.

**TABLE 6-1  
 COMPARISON OF ALTERNATIVES**

ISSUE	NO PROJECT	ALTERNATIVE SITE	ALTERNATIVE OWNERSHIP AND OPERATION	ALTERNATIVE INTAKE AND DISCHARGE DESIGNS	ALTERNATIVE FACILITY CONFIGURATION	REDUCED FACILITY SIZE
Land Use/ Relevant Planning	<	N/A =>	=	>	=	=
Geology, Soils, and Seismicity	<	</=	=	=	=	=
Hydrology, Drainage, and Storm Water Runoff	<	=>	=	=	=	</=
Air Quality	<	=	=	=	=	</=
Noise	<	=>	=	=	=	</=
Public Services and Utilities	> (water supply)	=	=	=	=	=>
Aesthetics/Light and Glare	<	=>	=	>	=	=
Hazards/Hazardous Materials	<	=	=	=>	=	=
Construction-Related Impacts	<	=	=	>	=	</=
Ocean Water Quality and Marine Life	<	>	=	<*	=	</=
Product Water Quality and System Integration	<	=	=	=	=	=

**Notes:**

- = Impact is equivalent to impact of proposed project (neither environmentally superior or inferior).
- < Impact is less than impact of proposed project (environmentally superior).
- > Impact is greater than impact of proposed project (environmentally inferior).
- \* Some alternatives may have greater impacts to marine life than the proposed project.

## 6.1 NO PROJECT ALTERNATIVE

None of the impacts associated with the proposed development and construction activities would occur if the “No Project” alternative were selected. Implementation of this alternative would leave the existing portion of the fuel oil storage facility in place, and would avoid any adverse physical or environmental impacts associated with the proposed project. Existing geologic, soils, and aesthetic conditions in the area would remain the same. Air quality, noise, and traffic impacts due to construction of the desalination facility, pipeline, and pump stations would not occur with the “No Project” alternative.

Water planning professionals have forecasted that water demands would increase in the Southern California area, and have specifically identified resource targets to help meet projected demands, including local seawater desalination facilities. (See Section 3.5, Project Need and Objectives, for a discussion of regional and statewide water planning.) Consequently, adoption of the “No Project” alternative would result in shifting the obligation for meeting a portion (up to 56,000 acre-feet per year [afy]) of future water demands from the project to: (1) increased conservation efforts (efficiency improvements and reduced consumption); (2) increased use of imported water supplies; (3) increased use of groundwater supplies; (4) construction of additional local water supply projects; and/or (5) construction of seawater desalination projects elsewhere in Orange County. Therefore, in some instances, the environmental impacts associated with the “No Project” alternative may be greater than those associated with the project.

### 1. INCREASED CONSERVATION EFFORTS

One result of selecting the “No Project” alternative could be an increased obligation (commencing as early as 2013 when the project is expected to be in full production) for Orange County water users to conserve up to an additional 56,000 afy over and above the conservation goals that are already projected to be necessary in the applicable water plans and the conservation goals that are now required by Senate Bill SBx7-7.

Adding an extra 56,000 afy to the annual conservation that is already occurring and planned for in Orange County would be difficult. Calculating against a base year of 1980, the Municipal Water District of Orange County (MWDOC) estimates that Orange County water users achieved approximately 84,000 acre-feet of conservation in 2005. The Metropolitan Water District of Southern California (MWD) 2004 Integrated Resource Plan (IRP) Update (see Section 3.5) set a significantly increased conservation target of 148,000 acre-feet for Orange County water users to reach by 2025. This equates to increased conservation expectations in Orange County of 64,000 acre-feet over and above the 84,000 afy projection for 2005.

The State of California has also recently imposed water-use reduction targets on urban retail water suppliers. Enacted in November 2009 and effective January 1, 2010, SBx7-7 establishes the State’s intent to achieve a 20% reduction in statewide urban per capita water use in gallons per capita per day by 2020. All urban retail water suppliers are required to report their water reduction targets for 2015 and 2020, and report them in their 2010 Urban Water Management Plan (UWMP). Under SBx7-7, there will be four methods for compliance. Until the analysis is completed, the additional amount of conservation to be achieved within Orange County is unknown. The California Department of Water Resources (DWR) is not expected to release the final compliance proposal until December 2010.

MWD has also identified that water users will face a second consecutive year of mandatory water supply reductions under an allocation plan that was approved by MWD on April 13, 2010 (MWD 2010). The allocation plan identifies water reductions to the agency's 26-member public agencies for a second year. This is the first time in MWD history that mandatory reductions will be in place for 2 consecutive years. The allocation plan is based on the fact that MWD water deliveries of imported water are down about 20% from previous years. To realize an additional 56,000 acre-feet of conservation savings in Orange County each year, over and above the conservation goals that are already projected to be necessary in the applicable water plans and the conservation goals that are now required by SBx7-7, would essentially require doubling of the County's future conservation efforts. To double the future conservation efforts of the County in such a relatively short time period would require, at a minimum, the imposition of prescriptive conservation standards for activities, like outdoor residential irrigation, that today are considered discretionary consumptive water use. A significant financial investment would also be required to achieve the additional levels of conservation.

## **2. INCREASED USE OF IMPORTED WATER SUPPLIES**

On September 30, 2009, as the 2008–2009 Water Year ended, the State of California was officially mired in another multiyear drought. DWR is providing updates on the drought situation through monthly releases of a publication entitled California's Drought Update. As summarized in the March 30, 2010, edition of California's Drought Update, "The 2009 Water Year (October 1, 2008 through September 30, 2009) was the third consecutive year of below average precipitation for the state. Annual statewide precipitation totaled 76 percent, 72 percent, and 63 percent of average for Water Years 2009, 2008, and 2007, respectively" (DWR 2010a, p. 3). Precipitation in Water Year 2010 has been higher than previous years, and as of April 10, 2010, average statewide precipitation and sierra snowpack slightly exceeded 100% of average (DWR 2010b). However, in addition to precipitation and snowpack, DWR also monitors storage levels in key reservoirs and runoff for major California rivers. In the March 30, 2010, edition of California's Drought Update, DWR notes that storage in key reservoirs "was 86 percent of average" as of March 24, 2010 (DWR 2010a, p. 8). DWR concludes, "with average statewide precipitation forecast for the next few months, and below average runoff forecast for the Sacramento River and San Joaquin River basins, it is still uncertain whether conditions have improved sufficiently to remove drought conditions" (DWR 2010a, p.13).

Although Orange County has made a significant financial investment in the regional imported water system (through ongoing water purchases from MWD), and the system has historically met all of Orange County's water supply needs, there is concern regarding the amount of water that would continue to be available for delivery to Orange County through MWD's regional imported water system over both the near and long term. While the current multiyear drought magnifies near-term concerns, increasing regulatory activity and environmental water needs may impact the availability of imported water supplies over the long run. The two main components of MWD's regional imported water system are the State Water Project (SWP) and the Colorado River Aqueduct.

Increasing regulatory activity and environmental water needs in Northern California have reduced the amount of imported water supply (compared to system capacity and earlier projections) that is available to Southern California through the SWP. More specifically, recent court decisions (in May and August 2007) and biological opinions released by the U.S. Fish and Wildlife Service (in December 2008 and June 2009) have forced DWR to curtail pumping in the Delta to protect the threatened Delta smelt, thereby reducing the amount of SWP water that is available to MWD. According to the December 2009 SWP Delivery Reliability Report (DWR 2009, p. 46), average

deliveries from the SWP will only be 60% of the “Table A” contracted amounts. In dry years, deliveries from the SWP would be even lower. Climate change is also likely to significantly affect the precipitation patterns in California, placing more stress on existing water systems and reducing the reliability of the SWP.

Likewise, a fundamental change has occurred in the availability and use of Colorado River water because California has been required to reduce the amount of Colorado River water it uses. Implementation of the Colorado River Water Use Plan results, among other things, in a reduction of up to 1 million afy as compared to the highest amount diverted in the past 25 years (from a high of 5.4 million afy to the California allotment of 4.4 million afy). In addition, there have been numerous predictions about the impact of climate change on the Colorado River. Three studies completed from 2005 through 2007 concluded that climate change could reduce the runoff of the Colorado River anywhere from 5% to 45% by the year 2050 (MWD 2009).

Sufficient water from MWD’s traditional sources, the Colorado River and the SWP, is not likely to be available on an average basis over the short term because of the drought, and may be restricted over the long run due to regulatory actions and competing demands from the environment. In the past, MWD has dealt with imported water shortages by purchasing agricultural water from Northern California (through the Sacramento Delta). Such water transfers are allowed and encouraged by state policy, but have the potential for economic dislocation and environmental issues related to the Delta that would be increased if additional supplies are required using these measures. Although MWD has secured a number of water transfers and storage of water in groundwater basins in the Central Valley of California, as a matter of policy, water transfers are typically short-term arrangements, and, as such, may not be sufficient to offset reliable long-term sources of supply.

Due to dry conditions in Southern California and uncertainty regarding future pumping operations from the SWP, MWD implemented a Water Supply Allocation Plan (WASP) at Level 2—a 10% reduction in available imported water supply for its Southern California service area. This action was taken in order to manage water demands through the period of July 1, 2009, through June 30, 2010, given the limited available imported water supplies. For the foreseeable future, allocation scenarios from MWD are expected to occur in years in which SWP allocations are at about 40% or lower. These decisions occur in April or May each year as the climatologic and regulatory conditions become known and the water year shapes up.

Under the MWD WASP, Orange County water users were required to reduce imported water use by 34,701 acre-feet during the period between July 1, 2009, through June 30, 2010. While reductions like those required under the MWD WASP may not occur every year, to realize an additional 56,000 acre-feet of imported water supplies over the long term each year (via additional water transfers or otherwise) would require considerable cost and effort. In addition, the direct and indirect economic and environmental impacts resulting from such transfers would have to be mitigated.

### **3. INCREASED USE OF GROUNDWATER SUPPLIES**

The Orange County Water District (OCWD) oversees management of Orange County’s most important local water supply, the Santa Ana River Groundwater Basin (the Basin). Because OCWD is the manager of the Basin and not an urban water supplier, it is not required to develop an UWMP. However, in 2004, OCWD adopted a Groundwater Management Plan (GMP) in its capacity to ensure sufficient water supplies for present and future beneficial uses within Orange County. The

2004 GMP was updated in June 2009 (the 2009 GMP Update) and provides the most current information on OCWD's management of the Basin.

OCWD does not manage the Basin by trying to keep it full. Rather it has established a goal of maintaining an accumulated overdraft to allow storage space for replenishment when excess water is available during wet years (OCWD 2009). Groundwater withdrawals from the Basin (known as Basin production) have increased from less than 200,000 afy in the early 1960s to more than 300,000 afy in recent times. OCWD manages the amount of production from the Basin through the establishment of a basin pumping percentage (BPP), which represents the ratio of groundwater supply to the total water supply that a retail water agency uses to meet demands. To guard against excessive overdrafting of the Basin, OCWD sets the BPP annually based on groundwater conditions (OCWD 2009, p. 6-14.) In recent years, the BPP has ranged from a high of 80% to a low of 62%. Retail agencies are permitted to pump more groundwater than their BPP allotment. However, OCWD charges a basin equity assessment for every acre-foot pumped over the BPP, making the cost of that water equal to or greater than the cost of imported water (imported water is provided to the retail agencies from MWD through MWDOC). In this way, OCWD manages the Basin through financial incentives and deterrents rather than defined pumping restrictions.

In comparison to Basin production that can exceed 300,000 acre-feet, the natural recharge of the Basin is small (estimated by the OCWD to be about 69,000 afy) (OCWD 2009). This natural or "incidental" recharge is directly related to the amount of local precipitation in a given year. Consequently, the Basin is primarily replenished through OCWD's "artificial recharge" operations. The "Representative Annual Basin Water Budget" created by OCWD for the 2009 GMP Update shows how artificial recharge in the amount of 272,500 acre-feet could support Basin production of 333,500 acre-feet (reproduced as Table 3-4 in this EIR).

Over the years, constantly improving this recharge system has doubled the yield of the groundwater basin. However, the ability to increase the volume of water taken into the basin through artificial recharge efforts is limited by the geology of the area. Current recharging capacity is approximately 300,000 afy. The groundwater basin is sustained by natural and man-made recharging (introduction of water) of the basin aquifers. OCWD manages a very sophisticated system of lakes (i.e., percolation ponds) in the cities of Orange and Anaheim that seep water through the lake bottoms. Each of the lakes acts like purification funnels delivering water into the groundwater basin. It is interesting to note, that only in that area of the cities of Anaheim and Orange is the soil composition of the groundwater basin (sands and gravels) conducive to water traveling to deep aquifers. Underlying the rest of the groundwater basin is a fairly consistent clay layer that prevents significant percolation into the groundwater basin outside the Anaheim and Orange areas.

One new source of supply for recharge operations is provided by the Groundwater Replenishment System (GWRS), which began operation in 2008. Phase 1 of the GWRS "would convert 100 million gallons per day of wastewater from the Sanitation District's sewer collection system into 72,000 acre-feet per year of desalted and purified wastewater. . . . The purified water would be used to protect and replenish Orange County's underground water supplies." Design of Phase 2 of the GWRS expansion is underway at this time and is expected to increase the yield from 72,000 afy up to 102,000 afy if constructed.

#### **4. CONSTRUCTION OF ADDITIONAL LOCAL WATER SUPPLY PROJECTS**

As shown in Table 3-3, Updated Resource Targets (With Supply Buffer), in Section 3.5 of the EIR, MWD is projecting that local projects (recycling, groundwater recovery, and desalination [both brackish and ocean desalination]) would shoulder a greater portion of the burden in meeting future water demands in Southern California. The target set by the 1996 IRP for 2000—300,000 afy of supply from local projects—was missed. However, at MWD’s July 21, 2009, IRP Workshop, it was reported that the local resources production estimates reached about 446,000 acre-feet of supply for 2010. This amount would meet the revised 2010 target of 410,000 afy from local projects as set by the 2004 IRP Update. The 2004 IRP Update set a 2025 target of 750,000 afy from local projects.

Clearly, it is expected (as shown by the planning projections in the MWD 2004 IRP Update) that many new water supply projects will be constructed in coming years. As an example, one new project in the planning phase within MWD’s service area is an indirect potable reuse project that would be implemented in Los Angeles County. Wastewater flows would be treated to a very high level, like the GWRS operated by OCWD, and then used for replenishment of the Los Angeles area groundwater basins to increase the yield of those basins. To realize an additional 56,000 acre-feet from local water supply projects each year (over and above the significant increases that are already planned) would require implementation of 10 to 12 new projects: a 30% increase over current plans. Implementation of 10 to 12 new projects would require considerable cost and effort. In addition, the direct and indirect economic and environmental impacts resulting from such efforts would have to be mitigated.

#### **5. CONSTRUCTION OF SEAWATER DESALINATION PROJECTS ELSEWHERE IN ORANGE COUNTY**

This alternative is discussed in Section 6.2, Alternative Site Alternative.

#### **CONCLUSION**

While the “No Project” alternative, including the four alternative water supply components evaluated, may provide a reliable supply of water to Orange County, it does not provide a “local source” that is sustainable and independent of climactic conditions (in other words, “drought proof”), or sustainable and independent of the availability of imported water supplies or local groundwater supplies. In addition, the “No Project” alternative will not meet the project objectives of reducing the salt imbalance of current imported water supplies or of minimizing demands on the imported water system. Finally, the “No Project” alternative will not remediate the project site.

The “No Project” alternative is not presently being considered because it fails to meet the basic project objectives. In addition, the existing project site degrades the aesthetic character of the vicinity and, if not remediated as proposed, may pose a significant health risk due to petroleum hydrocarbon contamination. Furthermore, the “No Project” alternative would not realize the project benefit of providing a “drought-proof,” high-quality, new potable water supply.

## 6.2 ALTERNATIVE SITE ALTERNATIVE

### ALTERNATIVE LOCATIONS WITHIN A 2-MILE RADIUS OF THE HUNTINGTON BEACH GENERATING STATION (HBGS)

A preliminary investigation of available land (5 acres or larger) within a 2-mile radius of the HBGS was performed for the proposed project. Open areas were identified within the 2-mile radius using aerial photographs and information obtained from the City of Huntington Beach website.

As shown in Appendix Z, Local Alternative Site Investigation, most of the open areas are parks and schools within the local community. There are a total of eight parks identified in the 2-mile radius, and most are less than 5 acres in size. In addition, there are five schools located in close proximity to the identified parks. Other open areas include wetlands, Orange County Sanitation District (OCSD) property (reserved for future facility expansion) and the Ascon/Nesi site (a former landfill approximately 40 acres in size). The Ascon/Nesi site is a highly contaminated piece of property and is currently under Department of Toxic Substances Control (DTSC) review for clean-up; therefore, this is not a viable alternative for the desalination project. There are three open areas to the northwest of the HBGS. However, all three sites are proposed for development. One of the sites is the former CENCO tank farm (25 acres), for which an entitlement has been approved for construction of 201 homes. The remaining two sites include the new Pacific City development located west of Huntington Street, which is under construction, and the new Hyatt Regency Huntington Beach Resort and Spa located west of Beach Boulevard, which has since been developed.

According to the City of Huntington Beach web page, only three of the parks analyzed within the site investigation are at least 5 acres. These parks consist of:

- Gisler Park, 11 acres
- LeBard Park, 5 acres
- Talbert Regional Park (the north part of the park is 99.1 acres while the south part of the park is 88.5 acres).

As these park facilities are actively utilized for recreation by the local community and no proposals to convert these facilities to alternative uses exist, no sites within a 2-mile radius are feasible for implementation of the proposed desalination facility.

### ALTERNATIVE LOCATIONS OUTSIDE OF THE CITY OF HUNTINGTON BEACH

Several other locations outside of the City of Huntington Beach have also been considered for this project, including the mouth of San Juan Creek (within the City of Dana Point), San Onofre (within San Diego County), and along the coast of the City of San Clemente (refer to Figure 6-1, Alternative Site Location Map, and Table 6-2, Alternative Site Comparison). These alternatives are not being considered for a variety of reasons, such as the 56,000 afy size of the proposed project (San Juan Creek), environmental concerns of a new ocean intake/discharge system (San Clemente), and/or engineering/acquisition issues (San Onofre). A discussion of potential impacts is discussed as follows.



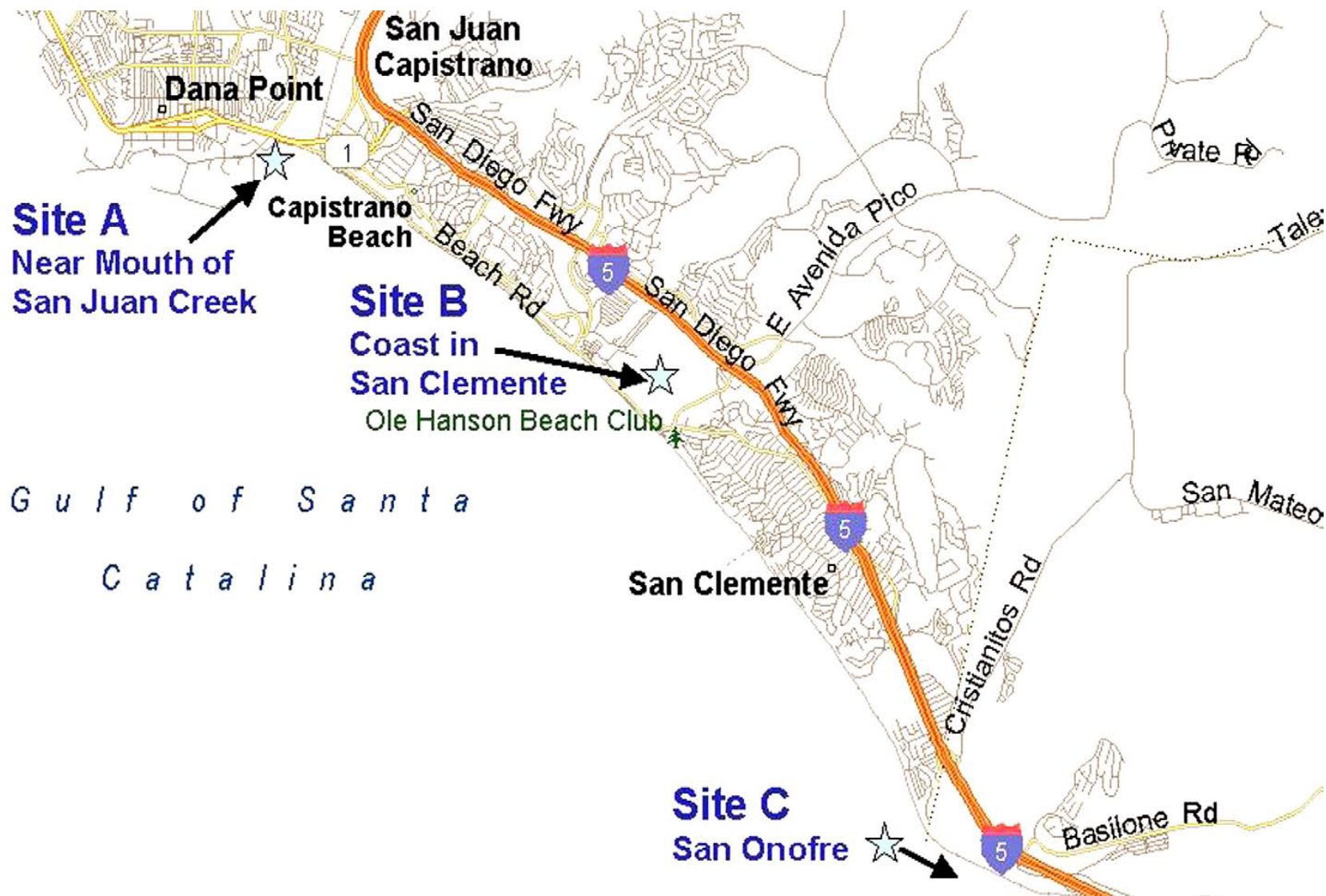


FIGURE 6-1  
Alternative Site Location Map

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### **iLand Use/Relevant Planning**

Impacts in regards to land use/relevant planning vary primarily on uses surrounding the project site and general plan/zoning designations for the site. Sensitive uses (e.g., residences, schools, recreational areas) exist in the vicinity of the San Juan Creek and San Clemente locations, thereby creating a greater potential for land use impacts to occur for these two alternative sites. In addition, the proposed industrial use may conflict with existing General Plan, and zoning designations within the City of Dana Point, City of San Clemente, and County of San Diego. The HBGS alternative site would have potentially significant operational impacts upon HBGS.

### **Geology and Soils**

Geology and soils impacts are dependent on the unique geological/soil characteristics of each alternative site considered. However, project implementation on an alternative site would comply with the Uniform Building Code (UBC) and all other state and local regulations in regards to geologic and seismic safety. Impacts are anticipated to be similar to those of the proposed project site, although the HBGS alternative site avoids issues associated with the Orange County Flood Control District (OCFCD) channel.

### **Hydrology, Drainage, and Stormwater Runoff**

Implementation of the proposed project at an alternative site outside of the City of Huntington Beach would likely have similar impacts in regards to hydrology, drainage, and stormwater runoff. As the design, area, and operation of the proposed desalination facility would generally remain the same (i.e., incorporation of an adequate on-site stormwater drainage system), both construction and long-term operational impacts are anticipated to be similar to those of the proposed project.

### **Air Quality**

Implementing the proposed desalination project on an alternative site would have similar air impacts to those of the proposed project. As stated previously, the design, area, and operation of the proposed desalination facility would generally remain the same. Therefore, air impacts resulting from short-term project construction and long-term facility operation would be similar to those of the proposed project within the City of Huntington Beach.

### **Noise**

Impacts in regards to noise are anticipated to be similar to those of the proposed project site. As stated previously, the design, area, and operation of the proposed desalination facility would generally remain the same. It is anticipated that the same noise-generating equipment (e.g., pumps and compressors) and noise attenuation measures would be incorporated upon implementation on an alternative site. In addition, the level of noise generated by mobile sources (e.g., automobiles driven by on-site employees, delivery trucks) would not change, as facility operations would not significantly change. However, alternative sites with nearby sensitive receptors may create greater noise impacts.

### **Public Services and Utilities**

Implementing the proposed desalination facility on an alternative site is anticipated to have similar impacts in regards to public services and utilities as the proposed project site. As stated previously, the design, area, and operation of the proposed desalination facility would generally remain the same. In addition, impacts to public services and utilities, such as police/fire service, solid waste, sewer, drainage, and electricity would not vary significantly from proposed project site implementation within the City of Huntington Beach.

### **Aesthetics/Light and Glare**

As stated previously, the design, area, and operation of the proposed desalination facility would generally remain the same. Although building height and lighting standards vary by city/county, it is expected that impacts in regards to aesthetics, light, and glare on an alternative site would be similar in nature to proposed project site implementation. However, construction of a new facility in a sensitive coastal environment absent of industrial uses (San Clemente) may have significant aesthetic impacts.

### **Hazards and Hazardous Materials**

Impacts in regards to hazards and hazardous materials are anticipated to be similar to those of the proposed project site. The nature in which hazardous materials would be stored, handled, and used for project operation is not expected to change upon alternative site implementation. However, one or more alternative sites may have less existing site contamination.

### **Construction-Related Impacts**

As stated previously, the design, area, and operation of the proposed desalination facility would generally remain the same. Although many short-term construction impacts (primarily noise and air) would vary by the amount of grading necessary, it is anticipated that the phasing and construction process would not vary significantly from proposed project site implementation.

### **Ocean Water Quality and Marine Life**

Depending on the alternative site selected, impacts in regards to ocean water quality and marine life may be greater than those of the proposed project site. If implementation of the proposed project on an alternative site requires the construction of new or modified intake and outfall facilities for facility operation (as is the case with the San Clemente or San Juan Creek alternative sites), substantial impacts to marine biological resources would occur, as construction and operation of facilities may disrupt sensitive marine habitats. If the desalination facility were to utilize existing intake and outfall facilities (as is the case with the San Onofre alternative site), impacts would be similar to those of the proposed project site within the City of Huntington Beach.

**TABLE 6-2**  
**ALTERNATIVE SITE COMPARISON: PROJECT YIELD, 56,000 ACRE-FEET PER YEAR**

	NEAR MOUTH OF SAN JUAN CREEK	COAST IN SAN CLEMENTE	SAN ONOFRE	HUNTINGTON BEACH
Environmental Issues	Many	Many	Many	Temporary
Land Use	Many Issues	Many Issues	Few Issues	None
Land Cost	Very High	Very High	Not Available	Moderate
Seawater Supply	Beach Well Intake	Requires New Intake	Not Available	Existing
Effluent	Requires New Outfall	Requires New Outfall	Not Available	Existing

### **Product Water Quality**

As the reverse osmosis treatment process utilized at an alternative site would be similar to that of the proposed project, the quality of product water is anticipated to be similar. While source water (i.e., ocean water) quality may vary by site, the reverse osmosis treatment process would most likely be capable of producing water meeting all Department of Health Services (DHS) requirements. Impacts due to product water compatibility are anticipated to be similar to the proposed project. It should be noted that at San Juan Creek, system and supply reliability would improve in South Orange County.

### **Climate Change**

Because energy use to produce 56,000 acre-feet of water per year would be the same regardless of location, impacts among the alternative site as compared to the proposed project would be similar.

### **Conclusion**

The San Juan Creek and San Clemente sites would have greater impacts due to sensitive surrounding uses and the need to create a new ocean intake/outfall. Implementation of the "Alternative Site" alternative would not avoid the project's identified unavoidable air quality impact, and may result in significant aesthetic and/or marine biological impacts. This alternative is not presently under consideration.

## **6.3 ALTERNATIVE OWNERSHIP AND OPERATION ALTERNATIVE**

The "Alternative Ownership and Operation" alternative would not change any of the design or operational features of the project. Rather, this alternative consists of the exact same project owned and operated by a public entity. The project proponent, a private entity, has already obtained lease rights to the site through negotiations with the current land owner (AES Huntington Beach, LLC, and City of Huntington Beach). For this alternative to be feasible, a public entity would first need to negotiate with the applicant or otherwise obtain lease rights to the site.

Assuming that rights to the site were acquired by a public entity, this alternative would result in all of the same potential environmental impacts that would result from implementation of the project as proposed (under private ownership).

Consequently, the “Alternative Ownership and Operation” alternative and the project as proposed would result in the same potential impacts on the environment.

## **6.4 ALTERNATIVE INTAKE AND DISCHARGE DESIGNS ALTERNATIVE**

### **ALTERNATIVE PROJECT INTAKE SOURCE WATER COLLECTION SYSTEMS**

The following discussion relates to alternative methods for ocean water intake systems. While these alternative design features are not completely distinct project alternatives, discussion of these alternative features is included in response to comments received on the original Notice of Preparation (NOP), and on the 2005 Recirculated Environmental Impact Report (REIR) requesting additional information on other potentially available intake systems.

The most common subsurface type intake systems, beach wells and seabed filtration systems, could be considered as alternative intake systems for the Seawater Desalination Project at Huntington Beach. These subsurface intake facilities have one key advantage over the project: the source water they collect is pretreated via filtration through the subsurface sand/seabed formations in the area of source water extraction.

#### **Beach Wells**

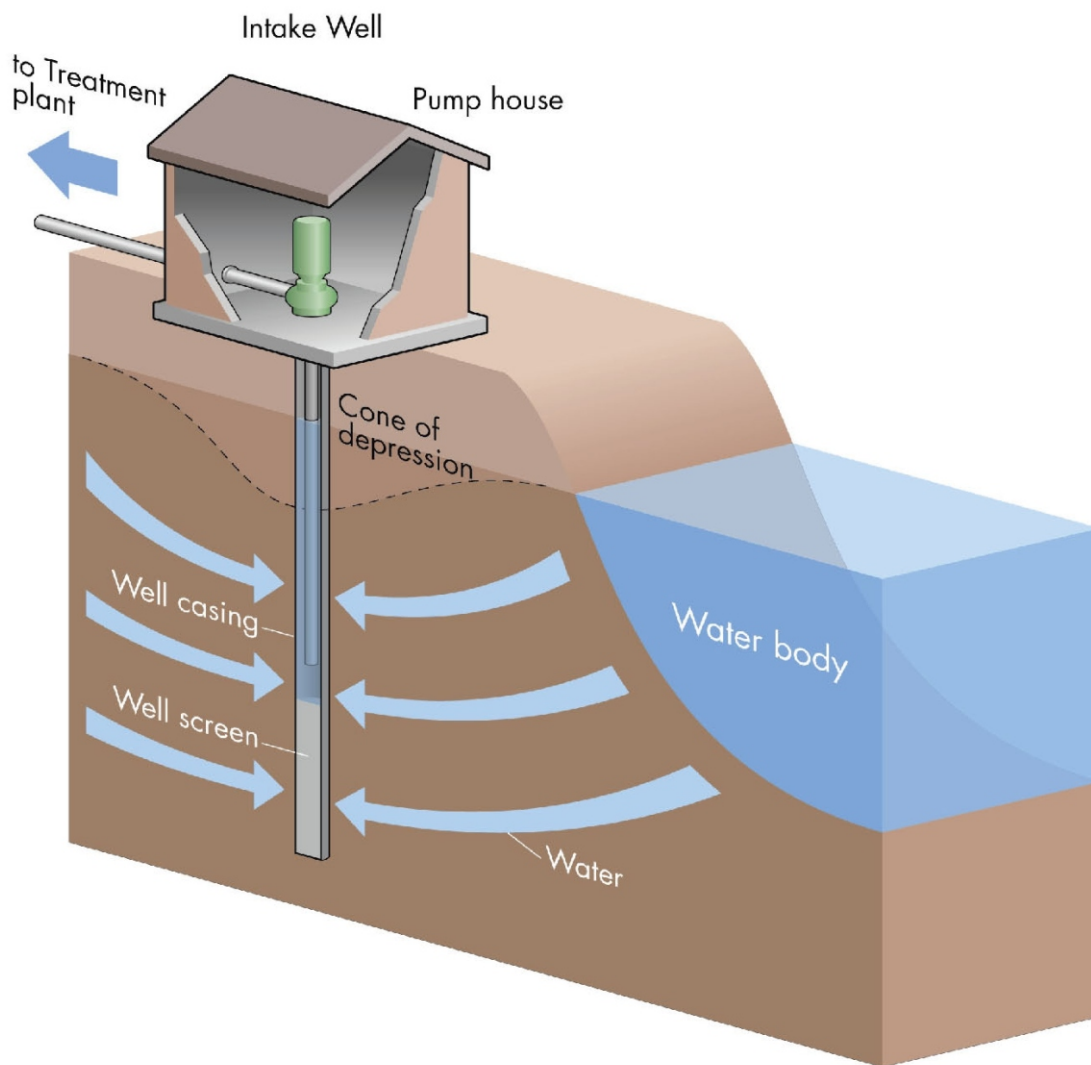
There are three types of beach wells typically utilized for the intake of seawater: (1) vertical intake wells, (2) slant intake wells, and (3) horizontal intake wells (also referred to as Ranney wells). A description of each is provided herein, followed by a summary of feasibility and potential environmental effects of such well systems.

#### **Vertical Intake Wells**

Vertical intake wells consist of water collection systems that are drilled vertically into a coastal aquifer. These wells consist of a non-metallic casting (typically, fiberglass reinforced pipe), well screens, and a stainless steel submersible or vertical turbine pump (see Figure 6-2, Vertical Beach Well). The well casting diameter is between 6 and 24 inches, and well depth does not usually exceed 250 feet. The vertical intake wells are usually less costly than the horizontal wells and the slant wells but their yield is relatively small. As described in Appendix AA, Evaluation of Alternative Desalination Plant Intake Technologies, a unit well yield of 1,560 gallons per minute (gpm) (2.2 million gallons per day (MGD)) would be expected from a properly constructed, large-diameter vertical production well for the site-specific conditions of the coastal aquifer near the Huntington Beach desalination facility site. In order to deliver 152 MGD of source seawater for the project, 69 duty and 17 standby wells of a 2.2 MGD intake capacity each would have to be operational. A total of 86 vertical intake wells would be constructed under this alternative. This would result in the need to impact 2.4 miles of coastline to collect and transport the source water to the proposed desalination facility through the use of the vertical intake system.

#### **Slant Intake Wells**

Slant wells are subsurface intake wells drilled at an angle and extending under the ocean floor to maximize the collection of seawater and the beneficial effect of the natural filtration of the collected water through the ocean floor sediments.



SOURCE: Water Globe Consulting 2010

**FIGURE 6-2**  
**Vertical Beach Well**

6483-01  
MAY 2010

Seawater Desalination Project at Huntington Beach

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The collection of 152 MGD of seawater needed for this project would require the use of 35 slant intake wells with a capacity of 3,000 gpm (4.3 MGD) each. These slant wells would be grouped in clusters of three. The distance between the well clusters would be 700 to 1,000 feet. The total length of beach occupied by slant wells would be approximately 4.6 miles. Appendix AA).

Operation of the slant wells at a total capacity of 100 MGD or more would cause the water level in the vicinity of the wells to drop from 5 to 60 feet below ground surface and the water table in 4,000-foot-wide zone located parallel to the shore and perpendicular to the well field line. Slant wells are similar in cost to the horizontal intake wells discussed below (Appendix AA).

#### Horizontal (Ranney) Intake Wells

Horizontal (Ranney) intake wells consist of a caisson that extends below the ground surface with water well collector screens (laterals) projected out horizontally from inside the caisson into the surrounding aquifer (see Figure 6-3, Horizontal (Ranney) Beach Well). The caisson is constructed of reinforced concrete that may be between 10 and 30 feet inside diameter with a wall thickness from approximately 1.5 to 3.0 feet.

Since the laterals in the Ranney wells are placed horizontally, a higher rate of source water collection is possible than with vertical wells. This allows the same intake water quantity to be collected with fewer wells. Individual Ranney wells are typically designed to collect between 0.5 to 5.0 MGD of source water. Based on the Evaluation of Alternative Desalination Plant Subsurface Intake Technologies by Water Globe Consulting (Appendix AA to the EIR), the comparative analysis utilized wells with a capacity of 5 MGD. These larger capacity intake wells require the use of vertical turbine pumps, which motors cannot be submersed in water, therefore these vertical turbine pumps must be housed above the high tide line. In addition, the size and servicing of the well pumps, piping, electrical, instrumentation, and other auxiliary equipment of large-capacity wells require that the location of the pump house be a minimum of 10 feet above beach grade. The caisson depth varies according to site-specific geologic conditions, ranging from approximately 30 feet to over 150 feet. The number, length, and location of the horizontal laterals are determined based on a detailed hydrogeologic investigation. Typically, the diameter of the laterals ranges from 8 to 12 inches and their length extends up to 200 feet. The size of the lateral screens is selected to accommodate the grain-size of the underground soil formation. If necessary, an artificial gravel-pack filter is installed around the screen to suit finer-grained deposits.

In large intake applications, such as that shown on Figure 6-4, Horizontal (Ranney) Beach Well Photo, the horizontal beach wells are typically coupled with the intake pump station installed above the well caisson. Figure 6-4 shows one of the three 3.8 MGD horizontal (Ranney) intake beach wells (two active intake wells/pumps and one standby well/pump) for the largest existing seawater desalination facility located on the Pacific Ocean coast in North America—the 3.8 MGD water supply facility for the Pemex Salina Cruz refinery in Mexico.

The Ranney wells could collect more water per well and deliver the total flow of 152 MGD needed for operation of 50 MGD seawater desalination facility. Even if ideal hydro-geotechnical conditions for this type of wells are assumed to exist (i.e., each well could collect 5 MGD of source water), horizontal well intake construction would include the installation of a total of 38 wells. The total length of coastal seashore impacted by this type of well intake would be 2.8 miles (Appendix AA). For 38 Ranney wells with an individual capacity of 5 MGD each, and a minimum distance between the individual wells of 400 feet, the footprint would be 15,200 feet long (400 feet x 38 wells = 15,200

feet (approx. 2.8 miles)). Figure 6-5, Horizontal (Ranney) Beach Well System Illustration, shows the approximate size and configuration of a horizontal intake well system for a 10 MGD seawater desalination facility with five intake wells. Figure 6-6, Conceptual Horizontal (Ranney) Well Intake Configuration at Huntington Beach, gives a general representation of the shoreline area in front of HBGS that would be impacted by the construction of a Ranney well intake system.

#### Feasibility Issues for Beach Well Intake Systems

##### *Transmissivity*

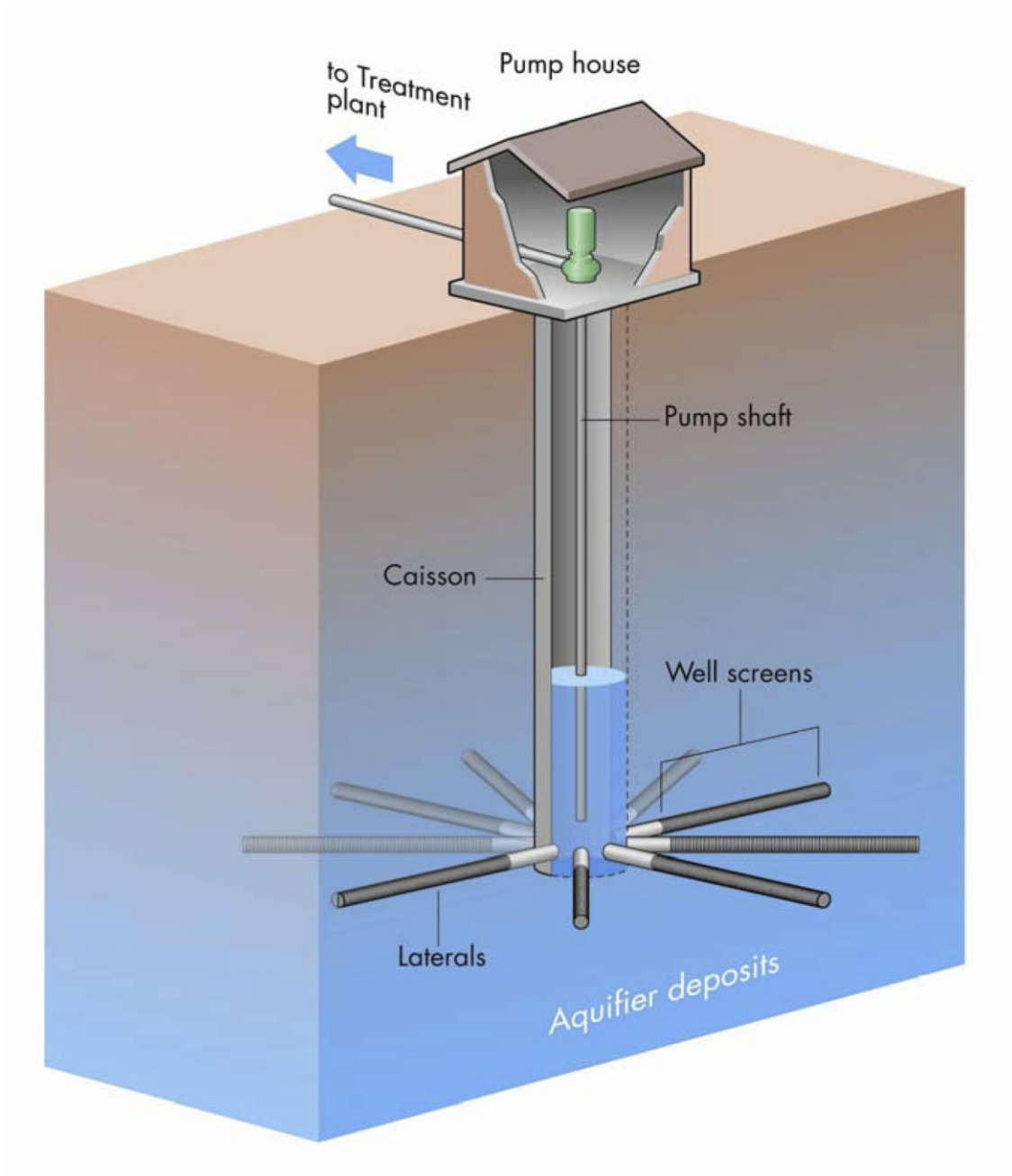
Use of beach well intake systems is not viable for the site-specific conditions of this project due to the limited transmissivity of the coastal aquifer near the desalination facility site and the low unit yield capacity of the vertical wells. A study of the hydrogeologic conditions of the Talbert Aquifer completed by CDM (2000), indicates that in the vicinity of the project site this aquifer has a range of transmissivity of between 17,500 and 23,400 square feet per day and storativity of  $4.6 \times 10^{-4}$  under confined conditions. Under unconfined conditions along the shore the Talbert Aquifer, storativity is estimated at 0.01 to 0.05. These aquifer characteristics limit the individual capacity of intake wells to 2.2 to 5 MGD and constrain the use of subsurface intakes for extraction of the source water volume required for this project. In addition, the limited production capacity of individual wells requires the use of multiple wells, increasing the environmental effects of the well systems.

#### Environmental Issues Associated with Beach Well Intake Systems

##### *Biological Resources*

A comprehensive feasibility study of the use of subsurface intakes in the vicinity of the proposed desalination facility site was completed by Psomas in 2007 and is included as Appendix AB, Technical Memorandum on Feasibility of Vertical Extraction Wells for Poseidon Desalination Plant Feed Water Supply. Hydraulic studies conducted by Psomas in the Talbert Marsh and Channel and Huntington Beach Channel confirmed tidal influence in these areas during certain tidal events. Psomas conducted an analysis of effects of operation of a beach well system in the project area, and determined that such a system may result in collection of up to a total of 7,517 gpm (10.8 MGD) of water from the adjacent Talbert, Newland, Magnolia, and Brookhurst marshes. The Psomas study further determined that approximately 30% of that total (approximately 3.2 MGD) would come from the marshes, resulting in detrimental effects on the wetland systems (see Appendix AB to this EIR).

Construction of any of the beach well facilities necessary to support the project would require the disruption of coastal areas within Huntington Beach and would permanently impact coastal and marine biological resources in the site vicinity. The beach excavation required for any alternative intake system has the potential to negatively impact shore birds, marine mammals, and intertidal organisms in the area of the construction.



SOURCE: Water Globe Consulting 2010

**FIGURE 6-3**  
**Horizontal (Ranney) Beach Well**

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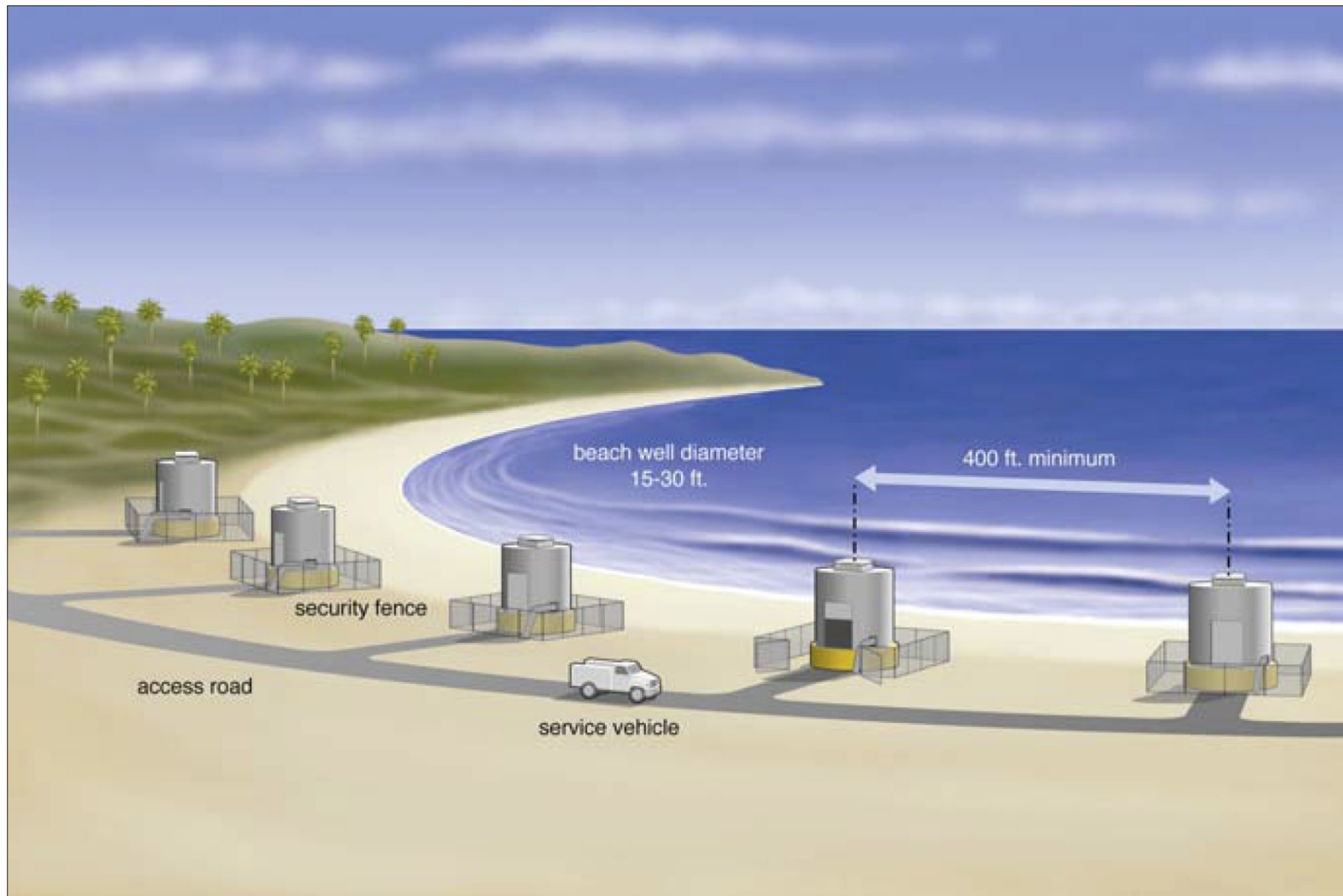
SOURCE: Water Globe Consulting 2010

**FIGURE 6-4**  
**Horizontal (Ranney) Beach Well Photo**

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SOURCE: Water Globe Consulting 2010

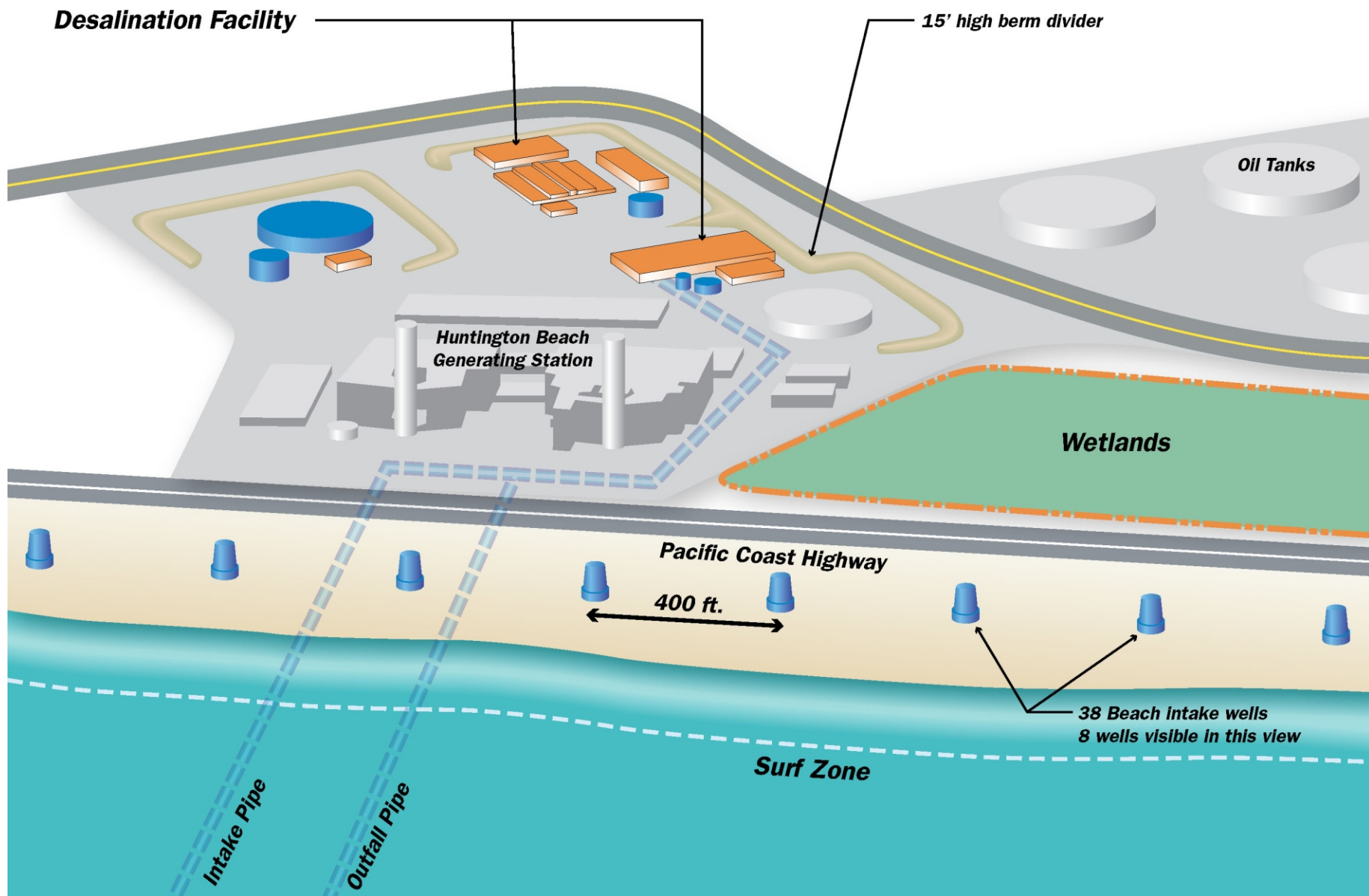
**FIGURE 6-5**  
**Horizontal (Ranney) Beach Well System Illustration**

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SOURCE: Poseidon Water LLC 2010

**FIGURE 6-6**

### Conceptual Horizontal (Ranney) Well Intake Configuration at Huntington Beach

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### *Hazards*

The Psomas study found that subsurface well intakes are likely to draw and cause movement of contaminated groundwater from the nearby Ascon Landfill as well as treated wastewater from the Talbert Seawater Intrusion barrier, both of which are located within several miles of the desalination facility site. Collecting groundwater from a coastal aquifer that may be contaminated with a leachate from the Ascon Landfill may introduce carcinogenic hydrocarbons into the source water supply of the desalination facility and therefore it may create an elevated public health risk. Removing a portion of the injection water from the Talbert Barrier would impair the function of this barrier to protect against seawater intrusion. Moreover, the introduction of treated wastewater collected from the Talbert Barrier into the source water supply of the desalination facility is not compliant with the existing regulatory requirements of the California Department of Public Health due to potential public health impacts.

### *Geology and Soils*

Extracting groundwater through subsurface intake systems would likely permanently dewater a portion of the near-surface sediments that consist of both coarse and fine-grained material. There is a potential that dewatering of the near-surface fine-grained sediments may cause subsidence to occur, and may result in damage to public beach structures and utilities, as well as undermine the structural integrity of the HBGS.

### *Aesthetics*

The implementation of beach well intake alternatives would require installation of very large number of wells and supporting infrastructure such as collection pipes, pump stations, service roads and electrical facilities. The length of shoreline that would be occupied by desalination facility intake using vertical beach wells would be up to 2.4 miles, resulting in significant impacts on visual resources and public access. It is uncertain whether such facilities would be capable of meeting the requirements of the California Coastal Act.

### *Product Water Quality*

The reverse osmosis (RO) treatment process does not add an appreciable amount of dissolved oxygen (DO) to the intake water. Therefore, the RO system product water and concentrated seawater in the desalination effluent flow would have approximately the same DO concentration as the source water.

Beach well water typically has a very low DO concentration. The DO concentration of this water is usually less than 2 milligrams per liter (mg/L), and it often varies between 0.2 and 1.5 mg/L. As a result, if beach well water were used as a source of raw seawater to the desalination facility, the concentrated seawater discharge flow would also contain DO concentration of approximately 0.2 to 1.5 mg/L. Such a concentration is significantly below the typical ambient ocean water DO concentration of 5 to 8 mg/L.

The Ocean Plan prohibits discharges from reducing ambient receiving water DO by more than 10%. For any alternative project, the Regional Board would assign a minimum month initial dilution that is appropriate to the flow and hydrodynamics of the discharge. Effluent DO requirements imposed by the Regional Board for an alternative project would depend on this assigned initial dilution. At the

7.5 to 1 initial dilution assigned to the current approved project, DO concentrations in the beach well influent would have to exceed 1.2 mg/L in order to not cause an ambient ocean water DO concentration of 8 mg/L to be depressed more than 10%. If the Regional Board were to designate an initial dilution of less than 7.5 to 1 for the alternative project, beach well DO concentrations would have to be correspondingly higher in order to comply with the Ocean Plan. For example, at an initial dilution of 1 to 1, beach well DO concentrations would have to exceed 6.4 mg/L in order to not cause an ambient ocean water DO concentration of 8 mg/L to not be depressed more than 10%. In addition, the low DO concentration under the beach well discharge scenario would not be in compliance with the U.S. Environmental Protection Agency's (EPA's) daily average and minimum DO concentration discharge requirements of 4 and 5 mg/L, respectively.

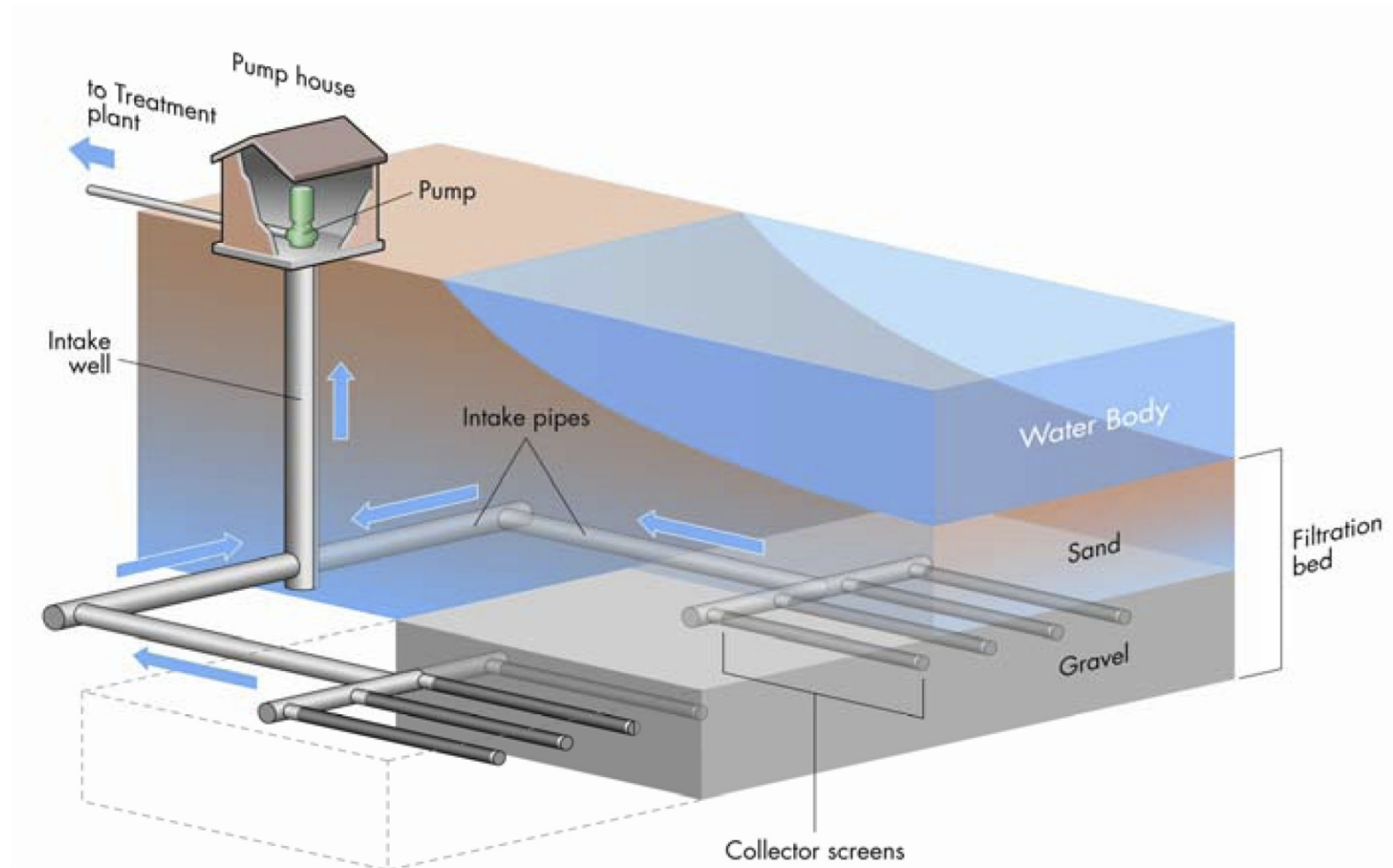
Since beach water DO may be as low as 0.2 mg/L, re-aeration would be required as part of any beach well alternative project in order to elevate desalination discharge DO concentrations and ensure compliance with the Ocean Plan and to ensure compliance with EPA minimum DO requirements.

In comparison, the discharge from the proposed project (under both co-located and stand-alone operation) would have a DO concentration of 5 to 8 mg/L. Such a discharge would be in compliance with the Ocean Plan DO requirements and would also be in compliance with all EPA requirements.

#### **Subsurface Infiltration Gallery (Long Beach/Fukuoka Type Intake)**

The subsurface infiltration gallery intake system (also known as under-ocean floor seawater intake or seabed infiltration system) consist of man-made submerged slow sand media filtration beds located at the bottom of the ocean in the near-shore surf zone, which are connected to a series of intake wells (see discussion on vertical and horizontal intake wells above) located on the shore (see Figure 6-7, Subsurface Infiltration Gallery (Fukuoka Type intake)).

Filter seabeds are sized and configured using the same design criteria as slow sand filters. The design surface loading rate of the filter media is typically between 0.05 and 0.10 gpm/square foot. Approximately 1 inch of sand is removed from the surface of the filter bed every 1 to 3 years depending on the rate of deposit of residuals on the surface of the filter bed. As seen in Figure 6-7, the ocean floor has to be excavated to install the intake piping of the wells. These pipes are buried at the bottom of the ocean floor excavation pit (see Figure 6-8, Subsurface Infiltration Gallery Cross-Section).



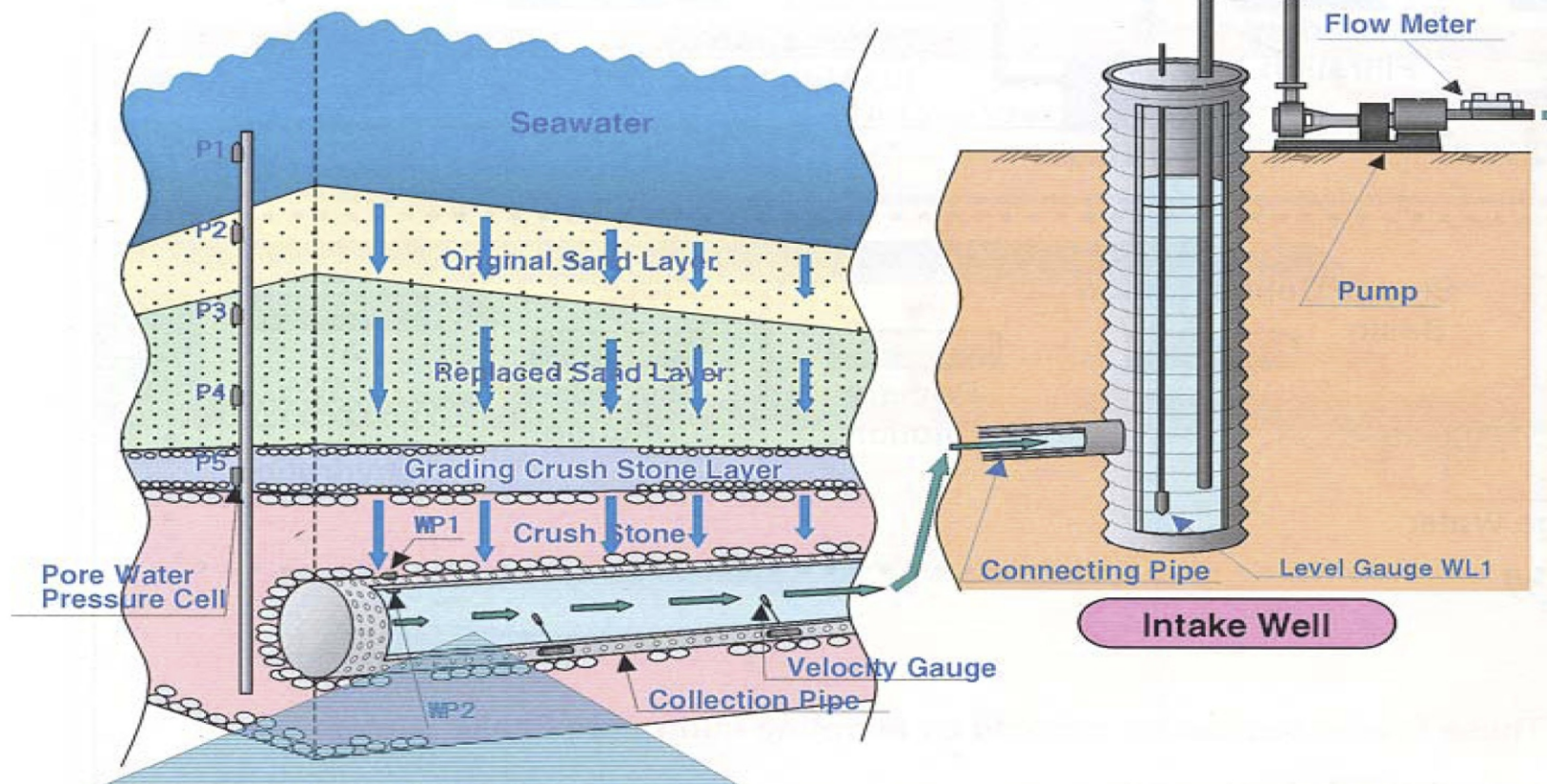
SOURCE: Water Globe Consulting 2010

**FIGURE 6-7**  
**Subsurface Infiltration Gallery (Fukuoka Type Intake)**

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SOURCE: Water Globe Consulting 2010

**FIGURE 6-8**  
**Subsurface Infiltration Gallery Cross-Section**

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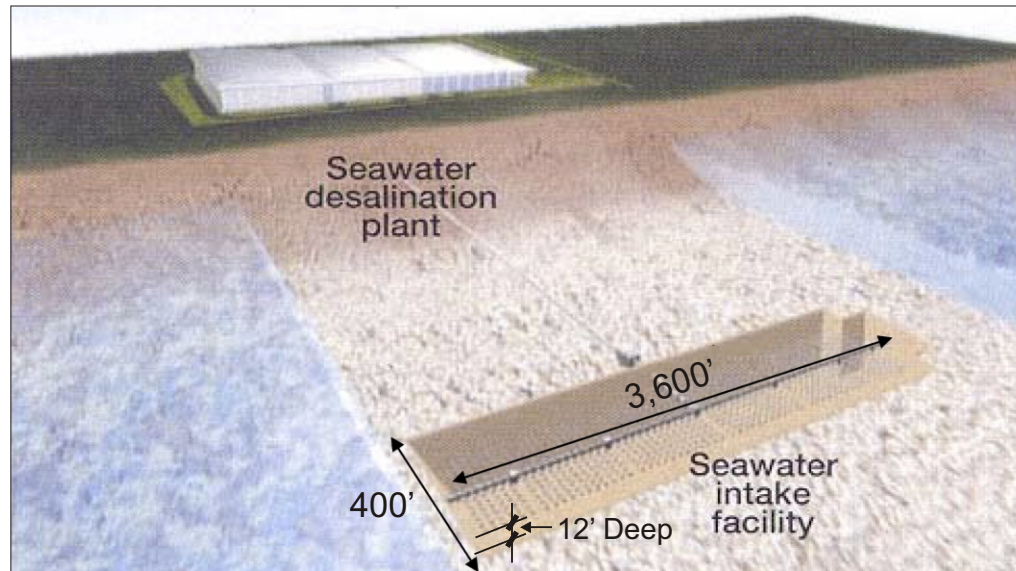
The construction of an infiltration gallery sized to provide 152 MGD of seawater would impact approximately 75 acres of seafloor. This system would consist of two key components: (1) the intake filtration bed cells and (2) 39 48-inch connector pipelines spaced at 210-foot intervals. The intake filtration bed would be 8,200 feet (1.5 miles) in length and 200 feet wide and 6 feet deep and would disturb approximately 37.5 acres of seafloor (see Figure 6-9, Subsurface Infiltration Gallery Approximate Impact Area). An additional 37.5 acres of seafloor would also need to be excavated to a depth of 6 feet to lay the 39 connector pipes from the shore through the surf zone to the filter bed.

The 39 collector pipelines would be connected to 39 wells located on the beach. The wells would pump the seawater to the desalination facility via a newly constructed pipeline (1 mile long, ranging from 24 to 72 inches in diameter). Each of the 39 wells would require approximately 2,800 square feet of beachfront property, for a combined loss of 2.5 acres of beachfront property and related impact to public access. The collection pipeline would require an easement over 1.5 additional acres of shoreline. The combined impact to benthic habitat and public access associated with the submerged seabed intake gallery is approximately 79 acres.

The construction of a Long Beach/Fukuoka-type subsurface intake would have other significant environmental impacts in addition to the effects on 79 acres of marine and coastal (see Appendix AA). Some of the key impacts are as follows:

- Excavation and construction of 39 intake water collection wells and trenches for collector piping along a 1-mile strip of the shoreline would limit public access to the beach for a period of over 2 years, which would result in a significant impact on the beneficial use of the Huntington Beach shoreline by the public and will cause measurable loss of income to visitor serving businesses and local tax revenue in Huntington Beach.
- The need to dewater and dispose over 363,000 cubic yards of ocean bottom sediments (37.5 acres of seafloor x 43,560 square feet/acre x 6 feet of depth)/27 cubic feet/yard = 363,000 cubic yards) to a sanitary landfill or ocean disposal site makes the use of such intake impractical because there are no available landfills in the vicinity of Huntington Beach which can accept such large volume of solids waste over such a short period of time, and ocean disposal may have regulatory restrictions.
- For land disposal, assuming that one large truck load carries 14 cubic yards, the removal and transportation of 363,000 cubic yards of ocean bottom sediments will require over 26,000 truck loads (52,000 one-way truck trips). It should be noted that since the native bottom sediments of the excavated ocean floor will need to be replaced with filtration sand which will need to be delivered on site, the amount of construction truck trips and associated traffic congestion will double. The total amount of truck traffic associated with the construction of the infiltration gallery will be over 20 times higher than the truck traffic associated with the construction of the desalination facility and the product water delivery pipeline.
- Because of the order-of-magnitude increase in traffic load due to the construction of the infiltration gallery, the total greenhouse gas (GHG) emissions associated with project construction will also increase substantially. This elevated GHG construction footprint will continue for over 2-year period.

- Once in the infiltration gallery is in operation, the energy associated with conveyance of source seawater from the infiltration gallery to the desalination plant will be comparable to that of the other subsurface intakes and will be approximately 2.5 times higher than that for collecting intake water from the HBGS' existing seawater intake system.
- In order to secure consistent operation of the infiltration galleries, the filter beds would need to be dredged every one to three years in order to remove the sediment and entrained marine life that would accumulate in the intake filter bed and over time will foul the intake. If this material is not removed, then the intake flow would decrease over time and the desalination facility would cease to function. The dredged material would need to be disposed away from the intake filter beds in order to prevent the removed solids from returning to the area of the infiltration gallery. This would not only result in frequent impacts on marine organisms in the area but would also render the area unavailable for recreational activities during maintenance activities. A significant reduction (over 2 times) in infiltration capacity of un-dredged filter bed over a period of 6 months was observed at the Long Beach infiltration gallery test facility and reported by Mr. Jason Allen from the Long Beach Water Department at the American Water Works Association's 2009 Annual Conference & Exposition in San Diego in June 2009 (Appendix AA). Between the period of June 2008 to April 2009, the intake flow collected by the infiltration system was steadily reduced from 200 to 350 gpm (avg. 275 gpm) down to 50 to 200 gpm (avg. 125 gpm), which is more than a two-fold reduction in production capacity. The water quality results from the Long Beach infiltration gallery test also show that the water quality collected by the infiltration gallery is not adequate to be directly used for RO desalination because of the very high level of turbidity (2.58 nephelometric turbidity units (NTU) vs. RO feed water quality requirement of 0.1 NTU or less) and high content of silt (Silt Density Index of 6.67 vs. RO feed water quality requirement of 4 or less).
- Water quality data from the infiltration gallery test of the Long Beach Water Department indicate that a full-scale desalination facility using an infiltration gallery as an intake will have to incorporate a pretreatment system to reduce turbidity and silt in the source seawater collected by the infiltration gallery down to levels suitable for RO desalination. In fact, the full-scale Fukuoka seawater desalination facility which also uses an infiltration gallery has an ultrafiltration pretreatment system ahead of the RO system to handle high level of turbidity and silt in the source water collected by this intake.



SOURCE: Water Globe Consulting 2010

**FIGURE 6-9**  
**Subsurface Infiltration Gallery Approximate Impact Area**

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The existing Fukuoka intake, which has a capacity of 13.2 MGD, is the largest operational submerged seabed infiltration gallery in the world. In order to achieve the 50 MGD of potable water that would be provided by the proposed project with a Fukuoka-type subsurface intake, scale-up issues would be 11 to 12 times greater. The technology used in the Fukuoka intake has never been implemented at the scale of the proposed project. The results from the testing of seabed infiltration by the Long Beach Water Department to date suggests that performance and construction issues associated with the use of a seabed infiltration intake system would not be viable or technically prudent.

In addition, excavation of a 79-acre, 1.5-mile-long by 200-foot-wide strip of the ocean floor in the surf zone to install a seabed filter system of adequate size to supply the desalination facility would impact the benthic environment in this location (Figure 6-9). The entire benthic ecosystem in the area covered by the seabed filter would be removed as part of the excavation process. The material removed would require disposal elsewhere, thus creating additional environmental impacts. The dredging of the sea floor and establishment of a layer filter bed would disrupt normal public use of the beach and surf zone in this area during construction and the periodic replacement of the layered filter media.

Furthermore, construction activities for the infiltration gallery would cause temporary disruption to local tourist and public use of the beach. The movements of materials and equipment needed for the project would restrict road traffic. The aesthetic and noise impacts of construction activities, as well as a probable reduction in public access to the area, would negatively impact businesses in the vicinity of the construction. The pipeline network necessary to link the intake well system with the desalination facility would be extensive and would require beach shoreline excavation, trenching and subsequent burial of the system.

In summary, based on overall impacts on the environment, the public coastal resources access/use issues associated with the construction and operation of a seabed infiltration gallery, this intake alternative would not be considered feasible for application to the proposed project.

### **Summary of Alternative Intake Systems**

Any one of the site-specific conditions would render subsurface intakes more impactful to the environment than the project because it would result in either irreversible damage to the Talbert Marsh, Brookhurst Marsh, and the Magnolia Marsh and negate years of restoration measures, result in a number of negative environmental impacts and human health risks, including the following: (1) detrimental environmental impact of intake well operations on the adjacent Talbert Marsh, Brookhurst Marsh, and the Magnolia Marsh due to dewatering; (2) poor water quality of the Talbert Aquifer in terms of ammonia, bacterial contamination and lack of oxygen; (3) interception of contaminated groundwater from nearby Ascon Landfill, which may introduce carcinogenic Hydrocarbons in the Source water supply of the desalination facility; (4) interception of injection water from Talbert Barrier by the intake and impairment of the function of this barrier to protect against seawater intrusion; (5) subsidence of public roads and structures due to drawdown of the groundwater table; and (6) impairment if the aesthetic value of the coastal shore by the obtrusive aboveground intake structures.

None of these potential environmental impacts are associated with the use of the cooling water system from the existing HBGS as source water for the project. The proposed intake system would not physically alter the HBGS intake or discharge system, and it would provide a more than

adequate supply of source water and dilution water. None of the proposed alternative intake systems would be an acceptable substitute to the proposed use of the existing HBGS cooling water system as the supplier of source water for the Seawater Desalination Project at Huntington Beach.

## **ALTERNATIVE PROJECT DISCHARGE**

### **Alternative Project Discharge Location**

The only existing ocean discharge facility (besides the HBGS outfall) in the project site vicinity is the 120-inch, 4.5-mile ocean outfall utilized at the OCSD regional wastewater treatment facility (located approximately 1.5 miles southeast of the proposed project site). The City inquired with OCSD regarding the feasibility of discharging the proposed desalination project's concentrated seawater discharge (50 MGD) through the OCSD's outfall. In a response letter dated June 24, 2004, OCSD indicated that, based on hydraulic discharge capacity performed for the OCSD's 1999 Strategic Plan, capacity within the OCSD outfall is not available for the proposed desalination project. Analysis of future wastewater projections shows that the capacity of the 120-inch outfall is anticipated to be exceeded once every 3 years by the year 2020, requiring the use of the District's emergency 1-mile ocean outfall (Herberg, pers. comm. 2004). As such, the use of the OCSD outfall for concentrated seawater discharge is not considered a feasible alternative to the proposed project.

### **Alternative Project Discharge Design - Diffuser**

All hydrodynamic analysis performed for the EIR is based on the proposed project utilizing the existing HBGS outfall infrastructure. The analysis determines the dilution and dispersion of the concentrated seawater that would be added to the discharge stream by the proposed desalination facility, which is discussed throughout this document as the proposed project. Yet, another outfall alternative would be to install a diffuser on the existing discharge tower.

The existing discharge tower produces a discharge point about mid-depth in the water column, making the retrofit of a conventional diffuser with lateral discharge arms infeasible from a structural strength and support perspective. Given these structural limitations of the existing infrastructure, it appears that the only viable diffuser concept is a velocity cap retrofitted to the discharge tower, identical to the one that already exists on the intake tower. A velocity cap would provide four lateral diffuser ports with rectangular cross section, producing four horizontal discharge jets. The jets would likely need to be oriented in the cross-shore and along shore directions, parallel to the walls of the discharge tower. With the velocity cap added, the discharge cross-sectional area is reduced from its present 346.5 to 225 square feet. Consequently, discharge velocities will increase from 0.34 feet/second directed vertically upward for low-flow and stand-alone operations without a velocity cap, to 0.53 feet/second directed horizontally with a velocity cap. For flow augmented stand-alone operations utilizing 152 MGD of source water intake flow rate, discharge velocities will increase from 0.46 feet/second for low-flow without a velocity cap, to 0.70 feet/second with a velocity cap.

As further described in Appendix AC, Supplemental Report on the Effects of a Retrofitted Diffuser on the Discharge Outfall for the Ocean Desalination Project at Huntington Beach, CA., the velocity cap diffuser would cause faster dilution of the sea salts beyond 600 feet from the outfall (far-field), but would result in higher salinities on the seafloor within 600 feet from the outfall (near-field). The velocity cap diffuser eliminates the concentrated seawater surface boil and increases the dilution

factor at the shoreline from 32 to 1 to 38 to 1. However, these favorable far-field and inshore effects produced by the diffuser are offset by increased benthic impacts near the outfall. The velocity-cap diffuser limits the dilution volume to only the lower half of the water column near the outfall where salinity is highest. Without the velocity cap the concentrated seawater discharge takes a vertical trajectory toward the sea surface, forming a surface boil, before subsiding back to the seafloor, passing through the full depth of the water column in the immediate neighborhood of the outfall, and thereby increasing the near-field dilution. Therefore, the diffuser would increase the seabed salinity at the base of the outfall under both the co-located and stand-alone conditions. Because the discharge diffuser produces mixed results in terms of salinity dispersion, and because the project would not result in significant impacts related to elevated salinity (see Section 4.10 of the EIR), the diffuser discharge alternative does not provide substantial benefits in terms of impact avoidance or reduction, and is therefore not being further considered.

## **6.5 ALTERNATIVE FACILITY CONFIGURATION**

### **HUNTINGTON BEACH GENERATING STATION (HBGS) ALTERNATIVE SITE**

As discussed in Chapter 3.1, Desalination Facility Planning Background, since the 2005 REIR was certified and the project approved, certain circumstances surrounding the project have changed and new information that was not known and could not have been known at the time that the 2005 REIR was certified, has become available. The site plan that the 2005 REIR was based on has been modified at the request of AES to consolidate the construction activities as close together as possible by shifting the RO building and associated facilities to the north. The revised site plan (that is addressed as the proposed project in this SEIR) would allow AES to utilize their property to the fullest extent possible. As a result of the new site plan for the proposed project, and because the project has been considered and approved by the City of Huntington Beach, the 2005 site plan has been added as the Alternative Facility Configuration to the proposed project. The operation of the proposed desalination facility would generally remain the same.

As shown in Figure 6-10, Alternative Facility Configuration, this site plan would result in the construction of the RO building, electrical room, chemical storage area, administration building, and pretreatment filters would be constructed where the existing fuel oil storage tank #3 is located and would include the area south of this tank as well (the area formerly referred to as the southeast fuel oil storage tank). The location of the product water storage tanks would be located in the northwestern corner of the project site consistent with the proposed project in this SEIR. All of the building dimensions and equipment specifications would be the same as proposed with the project in this document, but would be rearranged to fit generally within the site boundaries identified in the 2005 REIR.

### **LAND USE/RELEVANT PLANNING**

Potential impacts in regards to land use/relevant planning would be similar to the proposed project because the desalination facility location and general layout would not change substantially. As with the proposed project, the alternative site configuration would be surrounded by industrial uses and would be consistent with the Huntington Beach General Plan, Local Coastal Program, and Zoning and Subdivision Ordinance. The alternative site configuration would replace dilapidated fuel oil storage tanks with a desalination facility and aboveground product water storage tank, which would improve the site's aesthetic character. The existing site does not provide coastal access and the

proposed desalination facility does not interfere or limit access to the coast by the public. All alternative site configuration facilities would be shorter than the existing structures that will be removed and will be buffered by approved landscaping. The differences in land use and planning impacts between this alternative and the proposed project would be minimal, and impacts would be similar to those identified for the proposed project.

## **GEOLOGY AND SOILS**

Geology and soils impacts would be very similar to those of the proposed facility because the depth of excavation for the facilities and geologic conditions and constraints would not change with the alternative pant configuration. Grading activities during construction of the alternative site configuration would possibly cause wind and water erosion; however, any potential temporary increase in erosion would be reduced to less-than-significant levels with implementation of standard grading practices. Dewatering methods would be similar to those addressed for the project in Section 4.9, Construction-Related Impacts. Preliminary studies indicate that the risk of future surface faulting at the alternative site is minimal, and the operations staff would develop an earthquake mitigation and preparedness plan to ensure continuous facility operations and water delivery under earthquake emergency conditions. All structures would be designed in accordance with the seismic design requirements of the most recent edition of the UBC. Seismic activity from faults within the alternative site vicinity may result in liquefaction in soils at depths of 7 to 16 feet below ground surface (bgs). The on-site aboveground structures have the potential to experience post-liquefaction distress. With the implementation of mitigation measures such as those identified for the proposed project, impacts would be less than significant.

## **HYDROLOGY, DRAINAGE, AND STORMWATER RUNOFF**

The proposed project and the alternative facility configuration alternative would have similar impacts in regards to hydrology, drainage, and storm water runoff, because the facilities would have similar amounts of impervious surfaces, would involve similar construction techniques and activities and would have similar long-term operational characteristics. Best management practices (BMPs) would be identified in a Water Quality Management Plan (WQMP) to ensure that fertilizers and pesticides used would have less than a significant impact. Similar to the project, the alternative is designated with a Federal Emergency Management Agency (FEMA) flood-zone designation of "X" with protection from the 1% annual chance (100-year) or greater flood hazard by a levee system. Development of the site is anticipated to increase the amount of impervious area, thereby increasing surface runoff. However, an on-site local storm water drainage system would be implemented that would direct storm water to the catch basins and ultimately to either the HBGS on-site stormwater system or the City of Huntington Beach local stormwater system, both of which ultimately convey stormwater to the Pacific Ocean via the HBGS outfall. The existing exterior containment berm along boundary of the site would be left in place and would prevent direct spillage of product or by-product water onto the portion of wetlands situated to the southeast. Impacts associated with the alternative site configuration would be the same as with the proposed project, and in both cases would be less than significant with appropriate mitigation measures incorporated.

## **AIR QUALITY**

The alternative facility configuration would produce the same amount of product water and would require the same amount of electrical energy to operate on-site desalination facilities and off-site



product water pump stations. Up to approximately 840 megawatt hours per day would be consumed by the facility. Employee and truck delivery trips associated with the project would contribute to mobile source emissions and constitute the primary source of pollutant emissions. Project-generated long-term vehicle emissions associated with the alternative site configuration would be well below the SCAQMD thresholds. Impacts would be the same for the alternative site design as with the proposed project, and in both cases would be less than significant.

## **NOISE**

Pump systems associated with the desalination facility would be the most significant noise source at the site. The same noise attenuation measures would be incorporated for the alternative site configuration as for the proposed project. In addition, the level of noise generated by mobile sources (e.g., automobiles driven by on-site employees, delivery trucks) would not change. Impacts would be the same as with the proposed project and in both cases would be less than significant.

## **PUBLIC SERVICES AND UTILITIES**

As stated above, the design and operation of the proposed desalination facility would generally remain the same, but would be laid out in a different configuration within the previously proposed site boundary. It is not anticipated that the alternative site design would create a need for additional fire department services or police, school, library, or park and recreation facilities. The alternative site configuration would be composed of a majority of impervious surfaces, similar to the proposed project, and would require the implementation of a storm water drainage system. The alternative site plan would also be required to complete roadway improvements to the adjacent Edison Ave. Impacts to public services and utilities would not change from the proposed project and with application of mitigation as is proposed for the proposed project, impacts would be less than significant.

## **AESTHETICS/LIGHT AND GLARE**

The design of the project components within the alternative site plan is generally the same as the proposed project, with slight differences in configuration. The site design would be consistent with existing industrial uses and would improve the site appearance through the use of architectural design features and landscape screening. The alternative site design would produce minimal amounts of reflective surfaces and the resulting glare effects would be relatively minor compared to existing levels of glare in the site vicinity. It is expected that potential impacts in regards to aesthetics, light, and glare from this alternative would be similar in nature to the proposed project implementation. Impacts would be less than significant with incorporated mitigation similar to that identified for the project.

## **HAZARDS AND HAZARDOUS MATERIALS**

Impacts in regards to hazards and hazardous materials are anticipated to be similar to those of the proposed project. The same types of hazardous materials would be required for the alternative facility configuration and would be used for periodic cleaning of the RO membranes, treatment of potable product water, and would include storage of diesel fuel for emergency backup electricity generators at the off-site underground pump stations. Hazardous materials would be stored, handled, and used for project operation in a manner which is consistent with all Federal, State, County and City regulations, and impacts in regards to these hazardous materials is not expected

to be significant for the alternative site configuration. In addition, soils samples were analyzed at the project site for TPH-D. The samples for the area south of Tank 3 (an area which is included in the alternative site configuration, but not the proposed site configuration) were as high as 5,200 mg/kg, which is higher than what was found near Tank 2 (1,200 mg/kg) (which is included in the proposed site configuration, but not in the alternative site configuration). However, high concentrations of TPH-D were found in the ground water near Tank 2, but not to the area south of Tank 3. Therefore, the alternative site configuration would have similar impacts regarding hazardous material to the proposed site configuration.

### **CONSTRUCTION-RELATED IMPACTS**

The design, area, and operation of the proposed desalination facility would generally remain the same. It is anticipated that the phasing and construction process for the alternative site configuration would not vary significantly from proposed project site implementation. During the grading and construction phases for either configuration, it is expected that associated temporary, construction air emissions would have unavoidable cumulatively significant impacts. All other construction related impacts would be similar for the alternative and proposed site configurations and would be less than significant with incorporated mitigation.

### **OCEAN WATER QUALITY AND MARINE BIOLOGICAL RESOURCES**

The alternative site configuration would not change the required flows or operation of the HBGS cooling water system, and thus impacts on elevated salinity levels, impingement and entrainment are all expected to be similar for both the alternative and proposed site configurations, in both the co-located and stand-alone operating conditions. The HBGS intake configuration would remain the same, and thus factors affecting the quality of source water would be the same for both site designs. The HBGS outfall would also remain the same. In both cases, the proposed project would coordinate with HBGS to reroute discharges downstream of the desalination facility intake and in neither case are impacts resulting from HBGS operations expected to have a significant impact.

### **PRODUCT WATER QUALITY**

The product water quality of the alternative facility configuration would be the same as that of the proposed project. The same factors which affect product water quality for the proposed site configuration would also affect product water quality for the alternative site configuration. These include ocean water quality fluctuations, ocean water red tide algal bloom events, HBGS non-routine operations, and RO membrane performance. Impacts would be insignificant or less than significant for the alternative site configuration. Identical chemical conditioning and corrosion control and monitoring would be implemented for both configurations. Impacts due to product water compatibility and blending with other sources are not anticipated to result in significant impacts.

### **CLIMATE CHANGE**

Because energy used to produce 56,000 afy would be the same regardless of the site plan configuration in comparison to the proposed project, impacts to climate change would be similar. Additionally, the project, under both site configurations, proposes to reduce greenhouse gas emissions to less-than-significant levels, and therefore, the alternative does not provide substantial benefits in terms of impact reduction.

## **CONCLUSION**

Impacts associated with the alternative facility configuration would generally be similar to those identified for the proposed project, and mitigation measures identified for the proposed project would also be applicable to the alternative. The alternative facility configuration would provide a less-consolidated site design and reduce AES' ability to utilize their property to the fullest extent possible. Therefore, this alternative is not presently proposed by the applicant.

## **6.6 REDUCED FACILITY SIZE ALTERNATIVE**

The proposed desalination project is currently designed to incorporate RO technology to remove impurities from seawater to produce approximately 50 MGD (56,000 afy) of potable water for distribution to local water agencies. One alternative to the proposed project would be to reduce the output of project water to approximately 25 MGD. The design and operation of the proposed desalination facility would generally remain the same. However, this alternative would reduce the size of the facility, the amount of seawater required to produce water, and the amount of concentrated seawater discharged back into the HBGS outfall.

The 25 MGD alternative would not significantly reduce potential environmental impacts when compared to the proposed project. In addition, this alternative would result in a substantial decrease in the amount of desalinated water that could be produced, and thus a substantial increase in the cost of the desalinated water. Consequently, the 25 MGD alternative would not achieve the project objectives to provide a sufficient amount of water that would meet the future water needs projected by Orange County water purveyors, and would reduce overall water supply reliability that is sustainable and independent of climatic conditions. A discussion of potential impacts is discussed below.

## **LAND USE/RELEVANT PLANNING**

Potential impacts in regards to land use/relevant planning would be similar to the proposed project, because the desalination facility location and general layout would not change substantially. The zoning requirements would not change. A 25 MGD facility would use three to four acres less area than a 50 MGD facility. The height and architectural profile of all key buildings and other structures (e.g., storage tanks, pump stations) would remain the same. Facility capacity reduction would only impact the footprint of the buildings, and would not affect their appearance.

## **GEOLOGY AND SOILS**

Geology and soils impacts would be very similar to those of a 50 MGD facility because the depth of the facilities and associated excavation activities would not change with facility capacity reduction. Grading would be similar in both cases because of the need to remove the existing unused fuel oil storage tanks. However, because of overall reduction of the facility footprint, the construction of a 25 MGD facility as compared to a 50 MGD facility would require approximately 30% less earthwork and soil transportation, which in turn would result in reduction of the number of construction truck trips and traffic. Construction traffic is temporary in nature, and the difference between this alternative and the proposed project is not anticipated to be significant.

## **HYDROLOGY, DRAINAGE, AND STORMWATER RUNOFF**

The proposed project and the Reduced Facility Size alternative would have similar impacts in regards to hydrology, drainage, and storm water runoff. Both projects would incorporate an on-site drainage system to properly dispose of runoff. Although the Reduced Facility Size alternative would have a footprint approximately 30% smaller than the proposed project, impacts in this regard are not anticipated to substantially differ from the proposed project.

## **AIR QUALITY**

Long-term air quality impacts resulting from the Reduced Facility Size alternative would be slightly lower than the proposed project. As the project would produce a smaller amount of product water, less electrical energy would be necessary to operate on-site desalination facilities and off-site product water pump stations. In addition, employee and truck delivery operations may be reduced, thus resulting in slightly lower mobile air emissions. However, as the number of employee/truck trips would be negligible under either scenario, and both the proposed project and Reduced Facility Size alternative would be subject to the Regional Clean Air Incentives Market (RECLAIM), no substantial difference in impacts is anticipated.

## **NOISE**

Impacts in regards to noise are anticipated to be slightly reduced in comparison to those of the proposed project. As stated above, the design and operation of the proposed desalination facility would generally remain the same, but with a reduced amount of noise-generating equipment. It is anticipated that the same noise-generating equipment (pumps, compressors, etc.) and noise attenuation measures would be incorporated for the 25 MGD alternative. In addition, the level of noise generated by mobile sources (automobiles driven by on-site employees, delivery trucks) would not substantially change, as the facility operations would generally remain the same.

## **PUBLIC SERVICES AND UTILITIES**

Implementing a 25 MGD desalination facility is anticipated to have similar impacts in regards to public services and utilities as the proposed project site. As stated above, the design and operation of the proposed desalination facility would generally remain the same. In addition, impacts to public services and utilities such as police/fire service, solid waste, sewer, drainage, and electricity would not vary significantly from the proposed 50 MGD project.

## **AESTHETICS/LIGHT AND GLARE**

As stated above, the design and operation of the proposed desalination facility would generally remain the same. It is expected that potential impacts in regards to aesthetics, light, and glare on a 25 MGD alternative would be similar in nature to the proposed 50 MGD project implementation.

## **HAZARDS AND HAZARDOUS MATERIALS**

Impacts in regards to hazards and hazardous materials are anticipated to be similar to those of the proposed project. The same types of hazardous materials would be required for operation of a Reduced Facility Size alternative. The nature in which hazardous materials would be stored,

handled, and used for project operation is not expected to change for the 25 MGD alternative implementation.

### **CONSTRUCTION-RELATED IMPACTS**

Implementation of the Reduced Facility Size alternative would result in slightly reduced construction-related impacts in comparison to the proposed project (primarily at the proposed desalination facility site). At the desalination facility site (which would be reduced in size by approximately 30%), impacts in regards to hydrology/drainage/stormwater runoff, air quality, noise, and traffic would be incrementally reduced due to lower amounts of on-site grading, import/export haul trips and employee worker trips. As construction for the off-site booster pump stations and pipelines would not vary considerably for smaller product water pipelines and pump stations, impacts are anticipated to be similar to the proposed project. It is not anticipated that implementation of the Reduced Facility Size alternative would reduce the unavoidable cumulatively significant impact in regards to construction-related NO<sub>x</sub> to a less-than-significant level.

### **OCEAN WATER QUALITY AND MARINE BIOLOGICAL RESOURCES**

Like the proposed project, the 25 MGD alternative would not change the required flows or operation of the HBGS cooling water system. Under both the co-located and stand-alone operating conditions, the impact of the proposed project (50 MGD facility) on ocean water quality and marine life has been found to be less than significant (refer to Section 4.10, Ocean Water Quality and Marine Biological Resources). Under both co-located and stand-alone operating conditions, the 25 MGD facility would result in decreased salinity levels at the discharge locations as compared to the 50 MGD facility. But the difference is not anticipated to result in a change in the significance of impacts to the ocean environment surrounding the HBGS outfall, because of the small area of effect and lack of sensitivity of resources, as more fully described in Section 4.10. The 25 MGD alternative would also result in reduced impingement and entrainment effects, but as with the salinity effects, the impacts would be less than significant under either the alternative or the proposed project, in both co-located and stand-alone conditions. As a result, impacts in regards to ocean water quality and marine biological resources are anticipated to be reduced in comparison to the proposed project, but the level of significance of the impacts would not change.

### **PRODUCT WATER QUALITY**

The product water quality of the 25 MGD desalination facility would be the same as that of a 50 MGD facility. Identical chemical conditioning and corrosion control and monitoring would be implemented. Therefore, a reduction in the size of the proposed project would have no adverse effect on the product water quality. System integration of desalinated water with the existing potable water distribution system of Orange County would be the same for both 25 and 50 MGD projects. However, one of the benefits of the proposed project (a reduction in the overall salt content of existing potable water in Orange County through the introduction of desalinated water) would be reduced if the product water output of the project were reduced to 25 MGD.

### **CLIMATE CHANGE**

Greenhouse gas emissions would be reduced with the 25 MGD alternative based on reduced construction emissions and reduced indirect emissions from power usage during operation. However, the reduced product water volume would result in less of a reduction in imported water,

and the corresponding displacement of indirect emissions associated with that imported water. Additionally, the project proposes to reduce greenhouse gas emissions to less-than-significant levels, and therefore, the alternative does not provide substantial benefits in terms of impact reduction.

## CONCLUSION

While the Reduced Facility Size alternative may result in reduced impacts in comparison to the proposed project, the 25 MGD alternative would result in providing water at a cost that would not be acceptable to Orange County water purveyors, and would not produce a sufficient amount of desalinated water to meet projected future demand. Implementation of the 25 MGD alternative would not avoid the project's identified unavoidable construction related air quality impact, and would reduce the water quality benefits of the project as proposed. As such, this alternative is not presently under consideration.

## 6.7 ENVIRONMENTALLY SUPERIOR ALTERNATIVE

None of the above alternatives are considered "environmentally superior" to the proposed project, except for the "No Project" alternative. In this case, the California Environmental Quality Act (CEQA) requires identification of an "environmentally superior" alternative from among the other alternatives. Implementation of the project on an alternative site, while dependent on site-specific variables, is not anticipated to significantly reduce impacts, as alternative site implementation is expected to result in overall similar environmental impacts. The "Alternative Ownership and Operation" alternative would result in exactly the same environmental impacts as the proposed project. A hypothetical reduction in facility size can be argued to be "environmentally superior", based superficially on the reduction in facility size and corresponding reduction in traffic, air and noise impacts. However, reducing facility size and output would not substantially reduce any significant impacts. Other design options for intake and discharge either do not provide substantial environmental benefits, or result in greater environmental impacts overall. Consequently, and in accordance with the mandate of CEQA, the "Reduced Facility Size" alternative is selected as the environmentally superior alternative in comparison to the proposed project.